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Beam Power Tube

For Use in Communications Equipment at Frequencies Up to 175 Mc.

9-PIN MINIATURE TYPE

Electrical:

Heater Characteristics and Ratings:		
Voltage (AC or DC)	6.3 ± 5%	volts
Current	0.800	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts
Direct Interelectrode Capacitances:[o]		
Grid No.1 to plate	0.15	pf
Grid No.1 to cathode, grid No.3, grid No.2, and heater	10.0	pf
Plate to cathode, grid No.3, grid No.2, and heater	5.5	pf

Characteristics, Class A_1 Amplifier:

Plate Voltage	250	volts
Grid No.3	*Connected to cathode at socket*	
Grid-No.2 Voltage	250	volts
Grid-No.1 Voltage	-18	volts
Mu-Factor, Grid No.2 to Grid No.1	8.7	
Transconductance	5300	μmhos
Plate Current	40	ma
Grid-No.2 Current	3	ma

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See *General Section*
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No.E9-1)
Basing Designation for BOTTOM VIEW	9LK

Pin 1 - Cathode
Pin 2 - Grid No.1
Pin 3 - Grid No.2
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - Plate
Pin 7 - Grid No.3
Pin 8 - Grid No.2
Pin 9 - Cathode

Bulb Temperature (At hottest point on bulb surface)	225 max.	°C

→ AF POWER AMPLIFIER & MODULATOR — Class AB_1♦

Maximum CCS● Ratings, *Absolute-Maximum Values:*

DC PLATE VOLTAGE	375 max.	volts
GRID No.3 (SUPPRESSOR GRID)	0 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	volts
MAX.-SIGNAL DC PLATE CURRENT■	70 max.	ma
MAX.-SIGNAL PLATE INPUT■	21 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT■	2 max.	watts
PLATE DISSIPATION■	10 max.	watts

Typical CCS Push-Pull Operation:

Values are for 2 tubes

DC Plate Voltage	300	volts
Grid No.3	*Connected to cathode at socket*	
DC Grid-No.2 Voltage§	250	volts
DC Grid-No.1 Voltage§	-21	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	40	volts
Zero-Signal DC Plate Current	40	ma
Max.-Signal DC Plate Current	125	ma
Zero-Signal DC Grid-No.2 Current	2	ma
Max.-Signal DC Grid-No.2 Current	14	ma
Effective Load Resistance (Plate to plate)	5000	ohms
Max.-Signal Driving Power	0	watts
Total Harmonic Distortion	5	%
Max.-Signal Power Output (Approx.)	20.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.1 max.	megohm

→ RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy† and RF POWER AMPLIFIER — Class C FM Telephony

Maximum Ratings, *Absolute-Maximum Values:*

	Up to 175 Mc		
	CCS●	*ICAS●●*	
DC PLATE VOLTAGE	375 max.	375 max.	volts
GRID No.3 (SUPPRESSOR GRID)	0 max.	0 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	300 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-125 max.	-125 max.	volts
DC PLATE CURRENT	70 max.	80 max.	ma
DC GRID-No.2 CURRENT	15 max.	15 max.	ma
DC GRID-No.1 CURRENT	5 max.	5 max.	ma
PLATE INPUT	21 max.	24 max.	watts
GRID-No.2 INPUT	2 max.	2 max.	watts
PLATE DISSIPATION	10 max.	12 max.	watts

→ Indicates a change.

Typical Operation:

	As amplifier at 175 Mc			
	CCS		*ICAS*	
DC Plate Voltage	250	300	300	volts
Grid No.3	*Connected to cathode at socket*			
DC Grid-No.2 Voltage[□□]	200	200	250	volts
DC Grid-No.1 Voltage[⊕⊕]	-40	-42	-55	volts
Peak RF Grid-No.1 Voltage	47	52	62	volts
DC Plate Current	60	70	80	ma
DC Grid-No.2 Current	3.7	3.7	5.1	ma
DC Grid-No.1 Current (Approx.)	1.5	2.1	1.6	ma
Driver Power Output (Approx.)[▲▲]	1	1	1.5	watts
Useful Power Output (Approx.)[*]	6.5	8.5	10	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.1 max.	0.1 max.	megohm

PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony ←

Carrier conditions per tube for use with a maximum modulation factor of 1

Maximum Ratings, *Absolute-Maximum Values:*

	Up to 175 Mc		
	CCS	*ICAS*	
DC PLATE VOLTAGE	300 max.	300 max.	volts
GRID No.3 (SUPPRESSOR GRID)	0 max.	0 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	300 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-125 max.	-125 max.	volts
DC PLATE CURRENT	60 max.	70 max.	ma
DC GRID-No.2 CURRENT	10 max.	10 max.	ma
DC GRID-No.1 CURRENT	5 max.	5 max.	ma
PLATE INPUT	15 max.	17.5 max.	watts
GRID-No.2 INPUT	1.4 max.	1.4 max.	watts
PLATE DISSIPATION	7 max.	8 max.	watts

Typical Operation:

	At 175 Mc		
DC Plate Voltage	250	250	volts
Grid No.3	*Connected to cathode at socket*		
DC Grid-No.2 Voltage[▲]	250	250	volts
DC Grid-No.1 Voltage[★]	-70	-75	volts
From a grid-No.2 resistor of	33000	33000	ohms
RF Grid-No.1 Voltage	75	80	volts
DC Plate Current	60	70	ma
DC Grid-No.2 Current	2.5	3	ma
DC Grid-No.1 Current (Approx.)	2.1	2.3	ma
Driving Power (Approx.)[▲▲]	1	1	watt
Useful Power Output[*]	6.5	7.5	watts

← Indicates a change.

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.1 max.	0.1 max.	megohm

FREQUENCY MULTIPLIER

Maximum Ratings, *Absolute-Maximum Values:*

	CCS	*ICAS*	
DC PLATE VOLTAGE	375 max.	375 max.	volts
GRID No.3 (SUPPRESSOR GRID)	0 max.	0 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	300 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-125 max.	-125 max.	volts
DC PLATE CURRENT	50 max.	60 max.	ma
DC GRID-No.2 CURRENT	15 max.	15 max.	ma
DC GRID-No.1 CURRENT	5 max.	5 max.	ma
PLATE INPUT	13 max.	15 max.	watts
GRID-No.2 INPUT	2 max.	2 max.	watts
PLATE DISSIPATION	10 max.	12 max.	watts

Typical Operation:

	As doubler to 175 Mc		
DC Plate Voltage	250	250	volts
Grid No.3	*Connected to cathode at socket*		
DC Grid-No.2 Voltage	200	250	volts
DC Grid-No.1 Voltage⊕⊕	-53	-66	volts
From a grid-No.1 resistor of	53000	44000	ohms

→ Indicates a change.



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Peak RF Grid-No.1 Voltage	60	74	volts
DC Plate Current	50	60	ma
DC Grid-No.2 Current	2.6	3.5	ma
DC Grid-No.1 Current (Approx.)▲▲	1	1.5	ma
Driving Power (Approx.)▲▲	0.4	0.6	watt
Useful Power Output*	3	4.5	watts

As tripler at 175 Mc

DC Plate Voltage	200	250	volts
Grid No.3	*Connected to cathode at socket*		
DC Grid-No.2 Voltage	200	250	volts
DC Grid-No.1 Voltage●●	-90	-120	volts
From a grid-No.1 resistor of	50000	70000	ohms
Peak RF Grid-No.1 Voltage	105	130	volts
DC Plate Current	50	60	ma
DC Grid-No.2 Current	3	3.9	ma
DC Grid-No.1 Current (Approx.)	1.85	1.7	ma
Driving Power (Approx.)▲▲	0.4	0.6	watt
Useful Power Output*	1.4	2.3	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	0.1 max.	0.1 max.	megohm

○ Without external shield.

♦ Subscript 1 indicates that grid-No.1 current does not flow during any part of the input cycle.

● Continuous Commercial Service.

■ Averaged over any audio-frequency cycle of sine-wave form.

§ Obtained preferably from a fixed supply.

† Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of of the audio-frequency envelope does not exceed 115% of the carrier conditions.

●● Intermittent Commercial and Amateur Service.

□□ Obtained preferably from a separate source or from the plate-voltage supply with a voltage divider. If a series resistor is used, it should be adjustable to obtain the desired operating plate current after initial tuning adjustments are completed.

●● Obtained from a grid-No.1 resistor, or from a combination of grid-No.1 resistor with either fixed supply or cathode resistor.

▲▲ Driver stage is required to supply tube losses and rf-circuit losses. The driver stage should be designed to provide an excess of power above the indicated values to take care of variations in line voltage, components, initial tube characteristics, and tube characteristics during life.

* Measured at load.

▲ Obtained preferably from a separate source modulated along with the plate supply, or from the modulated plate supply through a series resistor. It is recommended that this resistor be adjustable to obtain the desired operating plate current after initial tuning adjustments are made.

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★ Obtained from a grid-No.1 resistor or from a combination of grid-No.1 resistor with either fixed supply or cathode resistor. The combination of grid-No.1 resistor and fixed supply has the advantage of not only protecting the tube from damage through loss of excitation but also of minimizing distortion by bias-supply compensation.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	*Min.*	*Max.*	
Heater Current	1	0.745	0.855	amp
Transconductance	1,2	4200	6400	μmhos
Plate Current	1,2	30	50	ma
Plate Current	1,3	–	50	μa
Grid-No.2 Current	1,2	–	7.5	ma
Reverse Grid-No.1 Current	1,4	–	2	μa
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode	1,5	–	20	μa
Heater positive with respect to cathode	1,5	–	20	μa
Leakage Resistance:				
Between grid-No.1 and all other electrodes tied together	1,6	100	–	megohms
Between plate and all other electrodes tied together	1,7	100	–	megohms

Note 1: With 6.3 volts ac or dc on heater.

Note 2: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 250 volts, and grid-No.1 voltage of −18 volts.

Note 3: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 250 volts, and grid-No.1 voltage of −48 volts.

Note 4: With plate voltage of 180 volts, grid No.3 connected to cathode, grid-No.2 voltage of 250 volts, grid-No.1 resistor of 0.1 megohm, and cathode resistor of 170 ohms.

Note 5: With 100 volts dc between heater and cathode.

Note 6: With grid No.1 100 volts negative with respect to all other electrodes tied together.

Note 7: With plate 300 volts negative with respect to all other electrodes tied together.



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AVERAGE CHARACTERISTICS

E_f=6.3 VOLTS
GRID Nº 3 CONNECTED TO CATHODE AT SOCKET.
GRID-Nº2 VOLTS=200

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AVERAGE CHARACTERISTICS

E_f = 6.3 VOLTS
GRID № 3 CONNECTED TO CATHODE AT SOCKET.
GRID-№ 2 VOLTS = 250

GRID-№1 VOLTS E_{C1} = 0

PLATE VOLTS

PLATE (I_b) OR GRID-№2 (I_{C2}) MILLIAMPERES

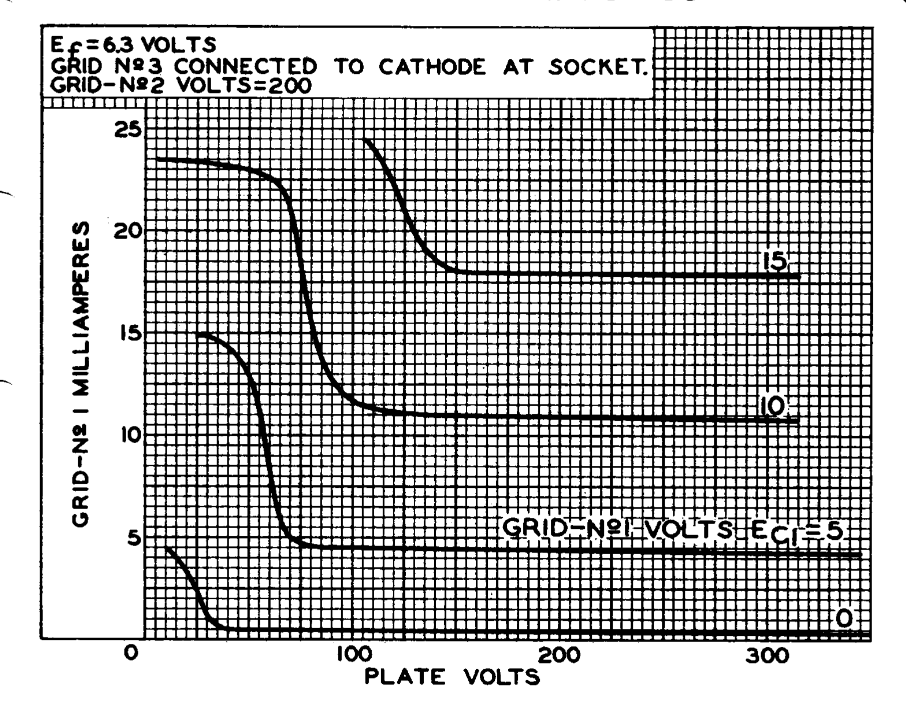
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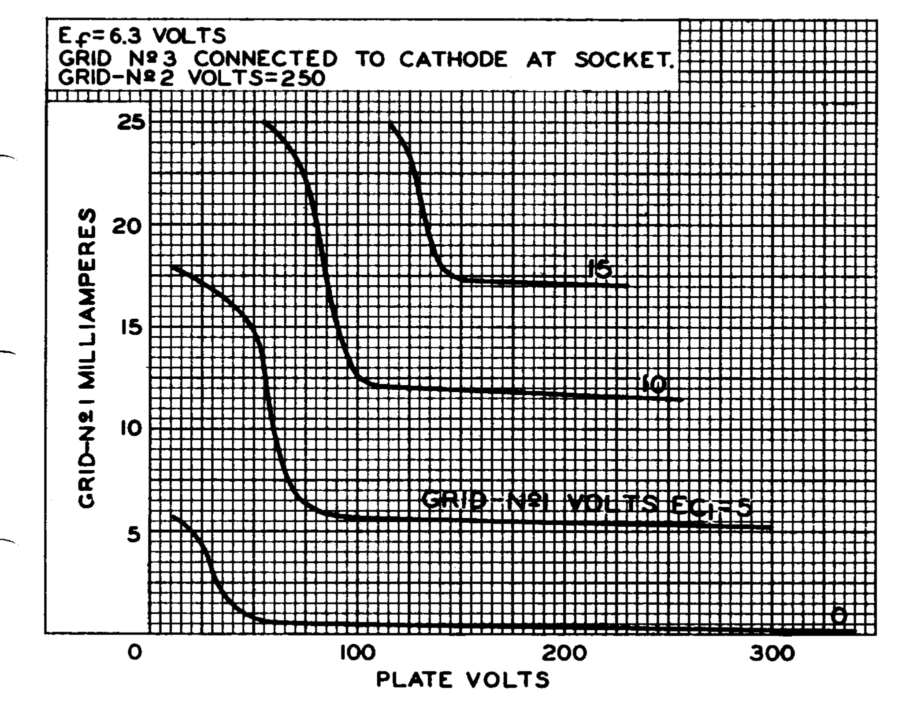


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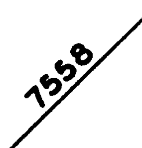
AVERAGE CHARACTERISTICS



92CS-10306R1



92CS-10307R1





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AVERAGE CONSTANT—CURRENT CHARACTERISTICS

E_f = 6.3 VOLTS
GRID № 3 CONNECTED TO CATHODE AT SOCKET.
GRID-№2 VOLTS=200
I_b=PLATE MILLIAMPERES
I_{C_2}=GRID-№2 MILLIAMPERES
I_{C_1}=GRID-№1 MILLIAMPERES

PLATE VOLTS

GRID-№ I VOLTS

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AVERAGE CONSTANT—CURRENT CHARACTERISTICS

E_f=6.3 VOLTS
GRID № 3 CONNECTED TO CATHODE AT SOCKET.
GRID-№ 2 VOLTS=250
I_b=PLATE MILLIAMPERES
I_{C2}=GRID-№ 2 MILLIAMPERES
I_{C1}=GRID-№ 1 MILLIAMPERES

PLATE VOLTS

GRID-№ 1 VOLTS

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